

SEQUENCE LISTING

SEQ ID NO: 1 (*Haemophilus aegyptius*)

MKRNLLKQSVIAVLIGGTTVSNYALAAQAQAQVKKDELSELKKQVKEMDAAIDGILDDNIAEAEVDAKLDQHSAAALGRHTNRLNNL
KTIAEKAKGDSSEALDKIEALEEQNDEFLLADITALEEGVDGLDDDIAGIQDNISDIEDDINQNSADIATNTAAIATHTQRLDNLNDRV
NNLNKDLKRGLAAQAALNGLFQPYNVGKLNLTAAVGGYKSQTAVAVG

SEQ ID NO: 2 (*Escherichia coli*)

MKTVNVALLALIISATSSPVVLAGDTIEAAATELSAINSGMSQSEIEQKITRFLERTDNSPAAYTYLTEHHYIPSETPDPTTQTPVQT
DPDAGQKTVAATGDVQTTARYQSMINARQSAVTDAAQTQITEQQAQIVATQKTLAATGDTQNTAHYQEMINARLAAQNEANQRTATEQ
GQKMNALTTDVAVQQQONERTQYDKQMQLAQESAQAHEQIDSLSDQVDTQTHQQLTNTQKRVADNSQQINTLNNHFSSSLKNEVDDNRKE
ANAGTASAIASQPVKTGDVMMVSAGAGTFNGESAVSVGTSFNAGTHTVLKAGISADTQSDFGAGVGVGYSF

SEQ ID NO: 3 (*EHEC*)

MNKIFKVIWNPATGNYTVTSETAKSRGKSGRSKLLISALVAGGMLSSFGALANAGNDNGQGVYDYGSGSAGDGWVAIGKGAKANTFMNTSGSSTAVG
YDAIAEGQYSSAIGSKTHAIGGASMAFGVSAISEGDRSIALGASSYSLGQYSMALGRYSKALGKLSIAMGDSSKAEGANAIALGNATKATEIMSIAL
GDTANASKAYSMALGASSVASEENAIAIGAETEAENATAIGNNAKAKGTNSMAMGFGSLADKVNIALGNGSQALADNAIAIGQGNKADGVDAIAL
GNGSQSRGLNTIALGTASNATGDKSLALGSNSSANGINSVALGADSIADLDNTVSVGNSSLKRKIVNVKNGAIKSDSYDAINGSQLYAISDSVAKRL
GGGAADVDDGTVTAPTYNLKNKSKNNVGAALAVLDENTLQWDQTKGKYSAAHGTSSPTASVITDVADGTISASSKDAVNGSQLKATNDDVEANTAN
IATNTSNIATNTANIATNTTNITNLTDVSGDLQADALLWNETKKAFAAHGQDTSKITNVKDADLTADSTDVAVNGSQLKTTNDVAVATNTTNIANNT
SNIATNTTNISNLTETVTNLGEDALKWDKDNVFTAAHGTETTSKITNVKDGDLTGSTDAVNGSQLKTTNDVAVATNTTNATNTTNISNLTETVTN
LGEDALKWDKDNVFTAAHGNNTASKITNILDGTVTATSSDAINGSQLYDLSSNIATYFEGNASVNTDGVFTGPTYKIGETNYYNVGDALAAINSSF
STSLGDALLWDATAGKFSKAGHTNGDASVITDVADGEISDSSSDAVNGSQLHGVSSYVVDALGGGAEVNADGTITAPTYTIANADYDNVGDALNAID
TTLDDALLWDADAGENGAFSAAHGKDKTASVITNVANGAISASSDAINGSQLYTTNKYIADALGGDAEVNADGTITAPTYTIANAEYNNVGDALDA
LDDNALLWDEETANGGAGAYNASHDGKASIIITNVANGSISEDSTDVAVNGSQLNATNMMIEQNTQIINQLAGNTDATYIQENGAGINYVRTNDDGLAFN
DASAQGVGATAIGYNSVAKGDSSVAIGQGSYSDVTGIALGSSSVSSRVIAKGSRDTSITENGVVIGYDITDGGELLGALSIGDDGKYRQIINVADGS
EAHDAVTVRQLQNAIGAVATTPTKYFHANSTEEDSLAVGTDLSLAMGAKTIVNGDKGIGIGYGAYVDANALNGIAIGSNAQVIHVNSIAIGNGSTTR
GAQNTYATYNDAPQNSVGEFSVGSADGQRQITNVAAGSADTDVAVNGQLKVTDAQVSQNTQSITNLDNRVTNLDNRVTNIENGIGDIVTTGSKYF
KTNTDGVDAQAQKDSVAIGSGSIAAADNSVALGTGSVATEENTISVGSSTNQRRITNVAAGKNATDAVNVAQLKSSEAGGVRYDTKADGSIDYSNI
TLGGNGGTTTRISNVSAVNNNDVNYAQLKQSVQETKQYTDQRMVEMDNKLSKTESKLSGGIASAMAMTGLPQAYTPGASMASIGGGTYNGESAVA
LGVSMSVANGRWVYKLQGSTNSQGEYSALGAGIQW

5 SEQ ID NO: 4 (*Actinobacillus actinomycetemcomitans*)

MTYQLFKHHLVALMVTGAISVNALAKDSFLENPSANLPQQVFKNRVDIFNNETNINENKKDIAINKANIASIEKDVMRNTGGIDRLAK
QELVNRARITKNELDIRKNTKSIAENTASIARIDGNLEGVNRVLQNVDRSTENAARSRAEQKIAENKKAIENKADKADVEKNRADI
AANSRAIATFRSSSQNIAALTTKVDRNTARIDRLDSRVNELDKVKNGLASQAALSGLFQPYNVGSLNLSAAVGGYKSKTALAVGSGY
RFNQNVAAKAGVAVSTNGGSATYNVGLNFEW

SEQ ID NO: 5 (*Haemophilus somnus*)

MKKVQFFKYSSLALALGLGVSAALAAPTSTSTTTGPEAPPTGPAPTAKDPLAETALAYDLENEVAYLRMKAGEWMQLGLDPEKEVIK
GWNEVKSLEPRIDGNGKDKQTKDQIAMLIRTVDNTELGRIVSTNIEDIKNLKKELYGFVEDVNESEARNISRIDENEKDIKNLKKELY
DFVEDVNESEARNISRIDENEKDIKNLKKELYGFVEDVNESEARNISRIDENEKDIKNLKKELYGFVEDVNESEARNISRIDENEKDIKNLKKELY
DANKQETEDDIADNAKAIHSNTKGIKNTKDIRDLDTKTKQMLENDKNLMTGLESLATETSKGFERFDVKTQQLDQAVANVGRVDIT
EQAIRQNTAGLVNVNKRVDTLDKNTKAGIASAVALGMLPQSTAPGKSLVSLGVGHHRGQSATAIGVSSMSSNGKWVVKGGMSYDTQRH
ATFGGSGVGGFFN

SEQ ID NO: 6 (*Haemophilus ducreyi*)

MKIKCLVAVVGLACSTITTMAQQPPKFAGVSSLYSEYDYGKGKWTWSNEGGFDIKVPGIKMKPKKEWISKQATYLELQHYMPYTPVLV
TSAPDVSPSSISILLYPMSDPDQLGINRQQLKLNLYSYFNDLRHDFKLKVLDAKISKNKQNIIDTISKYLLELGTLYLDGSYRMMEQNTN
NINKNTHNINKNTHNINKLSKELQTLANQSALSMLVQPNGVGKTSVSAVGGYRDKTALAIGVGSRTDRFTAKAGVAFNTYNGGMS
YGASVGYEF

SEQ ID NO: 7 (*EPEC*)

MKTVNVALLALIISATSSPVVLAGDTIEAAATELSAINSGMSQSEIEQKITRFLERTDNSPAAYTYLTEHHYIPSETPDPTTQTPPVQT
DPDAGQKTVAATGDVQTTARYQSMINARQSTVTDAAQTQITEQQAQIVATQKTLAATGDTQNTAHYQEMINARLAAQNEANQRTTTEQ
GQKMNALTTDVAAQQQKERAQYDKQMQLAQKSVQAHEQIESLRQDSAQTQQQLTNTQKRVADNSQQINTLNNHFSSSLKNEVEDNRKE
ANAGTASAIASQPVKTGDLMMVSAGAGTFNGESAVSVGTSFNAGTHTVLKAGISADTQSDFGAGVGVGYSF

SEQ ID NO: 8 (EAEC)

MKTVKLSLLAVVAVATVSPSAFAGDTVEAATTELTVIQPGMSQSEIDQKIGRFLERTGNSVAAQNYLIAHDYQTTTPQENTAASPVQP
 TNTLNPITNQAQOTDRDNGQDTAIQDAQHAANWASLKADDAQHAIQVQTDIDANTAAITDTRNDVSAVQSDVTNIKGDVAHAQSTADH
 ANANANTALINGVKLSGAVTENKNNIEQNRSDIADQQKLLASNEQKQIVRDNGQDTAIQDAQHAANWASLKADDAQHAIQVQTDIDA
 NKAATDIRNDVSAVQSDVTNIKGDVAHAQSTADHANANANTALMNGVKLS SAVTENKNNIEQNRSDIADQQKLLASNEQKQIVRDNG
 QDTAIQDAQHAANWASMKADDAQHAIQVQTDIDANKAAIADTRNDVSAVQSDVTNIKGDVAHAQSTADHANANANTALINGVKLSGA
 VTENKNNIEQNRSDIADQQQQLDETRKIVAATGQVQTAARYQSMIDARQTAAANAQQQAQADTQQQQMDDQQKQIDATQKTVSALGDAQ
 TNAHYQEMVNAGLRAQNDANARTAAEQKQKIDTLATNQATQQHINSVQYGEQIQRLAQDSTQTHEQIDSLTQDVTQTHQQLSNTQKRV
 ADNSQQITTLNNHFSSLKNEVEDNRKEANAGTASAIASQPVKAGDFMMSAGAGTFNGESAVSVGTSFNAGTHTVIKAGVSADTQ
 SDFGAGVGVGYSF

SEQ ID NO: 9 (EAEC)

MNKIFKVIWNPATGSYTVASETAKSRGKKSGRSKLLISALVAGGMLSSFGVQAQAGRDNGQGVNYGQGTGTGWVAIGEDAKANSFTDT
 GGSSTAVGYHSTADGRWSTALGAKTHSLGEASVALGINTTSAGERSLAIGASATSTGGFSIALGRYANSVGEFSIAQGDHAETGADD
 AIAFGRESKALGIMSIALGATANASKEYAMALGASSAASAANAIAVGRNSAAAGVDSLAFGRQSAASAANAIAAMGAESKAAENATAVG
 TNAEANGLSIALGSGSIADVDNTIALGNQSQAAGAIAIGQGNKADGANAIALGNGSITGGVNAIALGQGSYAGLENGTAIGAQAS
 AQGKNSVALGAGSVATDADTVSVGNNTAQRQIVNMAAGDISTTSTDAINGSQLYAISKSVDNLGGGATVNAQGVVTSPPNYRLKSGIF
 GTVGDALTGLDNNLTQWDSLKKAYSAAHGTDTTSTITNVKDGAISDTSKDAVNGSQLKTTNDNVATNTANITNTNSINTLTDSVGL
 KDDALLWNGTAFSAAHGTEATSKITNVKGDGDLTAGSTDAVNGSQLKTTNDNVATNTTNIITNLTDVGLKDDALLWNGTAFSAAHGTD
 ATSKITNVKGDGDLTAGSTDAVNGSQLKTTNDVAANTTNIATNTTNIITNLTDVDSLGDSDLWNATAGAFSAAHGTDATSKITNVTA
 GDLTAGSTDAVNGSQLKTTNDVAANTTNIATNTTNIITNLTDVDSLGDSDLWNATAGAFSAAHGTDATSKITNVKGDGDLTAGSTDA
 VNGSQLKTTNDVAANTTNIATNTTNIITNLTDVDSLGDSDLWNATAGAFSAKHGTNGTDSKITNLLAGTVSSDSTDAINGSQLYGL
 ADSFTSYLGGGADISDAGVLTGPTYTIGGTDYNNVGDALAAINTSFSTSLGDALLWDATAKGGDGAFSAGRGTDNTASIIITNVADGAI
 SSTSSDAINGSQLYDTSKYIADTLGGDAEVNADGTITAPTYAIAAGGSYSNVGDALEAIDTTLDDALLWDATANDGNGAFSAAHGKDKT
 ASVITNVANGAISATSSDAINGSQLYTTNKYIADALGGDAEVNADGSITAPTYTIANAEYNNVGDALDALLDNDALLWDATANDGAGAY
 NASHDGKASIIITNVADGNIGEGSTDAINGSQLENTNMLIQONSEIINQLAGNTSETYIEDNGAGINYVRTNDNGLAFNDASASGIGAT
 AVGYNVAVASGESSVAIGQSSSNVDTGIALGSSSVSSRVIVKGSRDTSVSEEGVIGYDTTDGEELLGALSIGDDGKYRQIINVADGSE
 AHDVTVRQLQNAIGAVATTPTKYFHANSTEEDSLAVGEDSLAMGAKTIVNGNAGIGIGYGAYVDANALNGIAIGSNARANHANSIAM
 GNGSQTTTGAQTGYAAYNMDAPQNSVGEFSVGSSEDGQRQITNVAAGSADTDAVNVGQLKVTDAQVSQNTQSITNLNNQVTNLDTRVTN
 IENGIGDIVTTGSKYFKTNTDGVDAQAQKDSVAIGSGSIAAADNSVALGTGSVANEENTISVGSSTNQRRITNVAAGVNATDAVNV
 SQLKSSEAGGVRYDTKADGSVDYSNITLGGGNGGTTTRISNVSAGVNNNDAVNYAQLKQSVQETKQYTDQRMVEMDNKLSKTESKLSGG
 IASAMAMTGLPQAYTPGASMASIGGGTYNGESAVALGVSMVSANGRWVYKLQGSTNSQGEYSALGAGIQW

SEQ ID NO: 10 (UPEC)

MNKIFKVIWNPATGSYTVASETAKSRGKKSGRSKLLISALVAGGLSSFGASADNYTGQPTDYGDGSAGDGWVAIGKGAKANTFMNTS
 GASTALGYDAIAEGEYSSAIGSKTLATGGASMAFGVSAKAMGDRSVALGASSVANGDRSMAFGRYAKTNGFTSLAIGDSSLADGEKTI
 ALGNTAKAYEIMSIALGDNANASKEYAMALGASSKAGGADSLAFGRKSTANSTGSLAIGADSSSSNDNAIAIGNKTQALGVNSMALGN
 ASQASGESSIONALGNTSEASEQNAIALGQGSIAKVNIALGNSLSGGENAIALGEGSAAGGSNSLAFGSQSRANGNDSVAIGVGAAA
 ATDNVAIGAGSTTDASNTVSVGNSATKRKIVNMAAGAI SNTSTDAINGSQLYTISDSVAKRLGGGATVGS DGTVTAVSYALRS GTYN
 NVGDALSGIDNNTLQWNKTAGAFSANHGANATNKITNVAKGTVSATSTDVVNGSQLYDLQQDALLWNGTAFSAAHGTEATSKITNVTA
 GNLTAGSTDAVNGSQLKTTNDNVTTNTTNIATNTTNIITNLTDVAVNGLGDDSLWNKTAGAFSAAHGTDATSKITNVTAGNLTAGSTDA
 VNGSQLKTTNDNVTTNTTNIATNTTNIITNLTDVAVNGLGDDSLWNKTAGAFSAAHGTDATSKITNVKAGDLTAGSTDAVNGSQLKTTNDNVSTNTTNI
 TNLTDAVAVNGLGDDSLWNKTAGAFSAAHGTDATSKITNVKAGDLTAGSTDAVNGSQLKTTNDNVSTNTTNIITNLTDVGLKDDSLW
 NKAAGAFSAAHGTEATSKITNLLAGKISSNSTDAINGSQLYGVADSFTSYLGGGADISDTGVLSGPTYTIGGTDYTNVGDALAAINTS
 FSTSLGDALLWDATAGKFSAKHGINNAPSVIDTVANGAVSSTSSDAINGSQLYGVSDYIADALGNAVNTDGSITPTPYAIAAGGSYN
 NVGDALEAIDTTLDDALLWDTTANGGNGAFSAAHGKDKTASVITNVANGAVSATSNDAINGSQLYSTNKYIADALGGDAEVNADGTIT
 APTTYTIANTDYNNVGEALDALLDNNALLWDEDAGAYNASHDGNASKITNVAAGDLSTTSTDAVNGSQLNATNILVTQNSQMINQLAGNT
 SETYIEENGAGINYVRTNDSGLAFNDASASGIGATAVGYNVAVASHASSVAIGQDSISEVDTGIALGSSSVSSRVIVKGTNTSVSEEG
 VVIGYDTTDGEELLGALSIGDDGKYRQIINVADGSEAHDAVTVRQLQNAIGAVATTPTKYFHANSTAEDSLAVGEDSLAMGAKTIVNGN
 AGIGIGLNTLVLADAINGIAIGSNARANHADSIA MGNGSQTTTGAQTNYTAYNMDAPQNSVGEFSVGSSEDGQRQITNVAAGSADTDAV
 NVGQLKVTDAQVSQNTQSITNLNTQVTNLDTRVTNIENGIGDIVTTGSKYFKTNTDGADANAQKDSVAIGSGSIAAADNSVALGTG
 SVADEENTISVGSSTNQRRITNVAAGVNATDAVNVSQLKSSEAGGVRYDTKADGSIDYSNITLGGGNSGTTTRISNVSAGVNNNDAVNY
 AQLKQSVQETKQYTDQRMVEMDNKLSKTESKLSGGIASAMAMTGLPQAYTPGASMASIGGGTYNGESAVALGVSMVSANGRWVYKLQ
 STNSQGEYSALGAGIQW

SEQ ID NO: 11 (*Shigella flexneri*)

MTNLGEDALKWDKDNVFTAAHGTETTSKITNVKDGDLTTGSTDAVNGSQLKTTNDAVATNTTNIATNTTNIISNLTETVTNLGEDALK
 WDKDNVFTAAHGNNTASKITNILDGTVTATSSDAINGSQLYDLSSNIATYFGGNASVNTDGVFTGPTYKIGETNYYNVGDALAAINS
 SFSTSLGDALLWDATAGKFSAXHGTNGDASVITDVADGEISDSSSDAVNGSQLHGVSSYVVDALGGGAENVADGTITAPTYYTIANADY
 DNVGDALNAIDTTPDDALLWDADAGENGAFSAAHGKDKTASVITNVANGAISAASSDAINGSQLYTTNKYIADALGGDAENVADGTIT
 APTYYTIANAEYNNVGDALDALLDDNALLWDKTANGGAGAYNASHDGKASIIITNVANGSISEDSTDAVNGSQLNATNMIEQNTQIINQL
 AGNTDATYIEENGAGINYVRTNDNDLAFNDASASGVGATAVGYNAVASGASSVAIGQSSSTVDTGIALGSSSVSSRVIAKGSRDTSV
 TENGVVIGYDTTDGELLGALSIGDDGKYRQIINVADGSEAHDAVTVRQLQNAIGAVATTPTKYFHANSTAEDSLAVGEDSLAMGAKTV
 VNGNAGIGIGLNTLVLADAINGIAIGSNARANHANSIAMNGSQTTTGAQTGYTAYNMDAPQNSVGEFSVGESEDGQRQITNVAAGSAD
 TDAVNVGQLKVTDERVAQNTQSITNLNNQVTNLDTRVTNIENGIGDIVTTGSTKYFKTNTDGVDAQAQKDSVAIGSGSIAAADNSVA
 LGTGSVAEEENTISVGSSTNQRRITNVAASVNATDAVNVSQKSSSEAGGVRYDTKADGSIDYSNITLGGNGSTTRISNVSAGVNNND
 AVNYAQLKQSAQETKQYTDQRMVEMDNKLSKTESKLSGGIASAMAMTGLPQAYTPGASMASIGGGTYNGESAVALGVSMVSANGRWVY
 KLOGSTNSQGEYSALGAGIQW

SEQ ID NO: 12 (*Brucella melitensis*)

MSFFKKNISITAMGGLMLSLAVDAAKAEENVSQVKLPPVFVFELENQGLANIALIRPRVIAPDNNLRPGGIVSGIAGLLTLGQENRN
 LIENRQVINNNNTAIGQNRSTSISTNAKGVADNRAAIRQNSAAISALGQVRDGLQGQINSARKEARAGAANAALSGLRDNRPGKVS
 IATGVGGFKGSTALAAGIGYTSKNENARYNVSVAYNEAGTSWNAGASFTLN

SEQ ID NO: 13 (*Brucella suis*)

MSFFKKNISITAMGGLMLSLAVDAAKAEENVSQVKLPPVFVFELENQGLANIALIRPRVIAPDNNLRPGGIVSGIAGLLTLGQENRN
 LIENRQVINNNNTAIGQNSDRIDANAKGVADNRAAIGQNSGRIDANAKGVADNKAAGRNSGRIDANAKGVADNKAAGRNSGRIDT
 NAKGVADNRAAISQNRGRINANAAGVASNRAAIRQNSAAISALGQVRDGLQGQINSARKEARAGAANAALSGLRDNRPGKVS
 VGGFKGSTALAAGIGYTSKNENARYNVSVAYNEAGTSWNAGASFTLN

SEQ ID NO: 14 (*Ralstonia solanacearum*)

MVFSAMPQYACAEMLLQNDPGTNCGSVGDAYAWARGDGYSGCKVGYEAAKNLAKGTAFGNSLGQLSPGTNILVYGSTLRAGMNDEVTP
 LDSMNIIGHLDVWGASGFHGGVDMNNSAIKNLADGTLSATSTEAVTGRQLNATNTNITNLQNSIKSISSSASLVQQAAGKDITVAKD
 LDGDAVDFSGKKLSDSTTFSRKLTVGVAEGTLSATSTDAVSGKQLYTTNQNLSSTTNQNLADTNKSLAETNKNVSATTTNITNLQNTIKN
 ISGGSAGLVQQAAGKDITVAKDLGDAVDFSGKKLSDSTTFSRKLTVGVAEGTLSATSTDAVSGKQLYTTNQNLSSTTNKDLANTNTRL
 TTAEGNLSNNTTSITNLQNTIKNISGGSAGLVQQAAGKDITVAKDLGDAVDFSGKKLSDSTTFSRKLTVGVAEGTLSATSTDAVSGR
 QLYTTNQNLSSTTNQNLADTNKSLAETNKNVSATTTNITNLQNTVNNISSGSAGLVQQAAGKDITVAKDLGDAVDFSGKKLSDSTTF
 SRKLTVGVAEGTLSATSTDAVSGKQLYTTNQNLSSTTNQNLADTNKSLAETNKNVSATTTNITNLQNTVNNISSGSAGLVQQAAGKDIT
 VAKNLDGDAVDFSGKKLSDSTTFSRKLTVGVAEGTLSATSTDAVSGKQLYTTNQNLSSTTNKDLANTNTRLTTAEGNLSNNTTSITNLQNT
 TIKNISGGSAGLVQQAAGKDITVAKDLGDAVDFSGKNSLSDSTTFSRKLTVGVAEGTLSATSTDAVSGKQLYTTNQNLSSTTNQNLADT
 NKSLAKTNNNVSATTTNITNLQNTVNNISSGSAGLVQQAAGKDITVAKDLGDAVDFSGKKLSDSTTFSRKLTVGVAEGTLSATSTDA
 VSGKQLYATNQNVSKLSANVTDVSDSVTNIKNTMNTIVNGGGLKYFHANSTLDDAQAMGLESIAFGGAAVAAGMNSMAMGGNARAVAG
 NAVALGAGSVADRANTVSVGSAGKERQITNVAAGTADTDAVNVAQLKAAGIINGSGRTNATVTYGTNADGSADYGNVTLGGGNAPAGT
 AIHNVAAGTAETDAVNVRQMNAIASVQKVSNTNDPMFAADGDRAVKRASAKGTHATAMGAASAGGDQSVATGHNAQSGGDSVAMG
 ANAKATANHAVAVGSGSVANRANTMSVGSAGSERQITNVAAGVQGTDAVNVSQLSQAVYAAVGDLPAGTTARQYTDQEQIGMVRQGISQ
 VARGAYSGIAAATALTMIPDQDQKSIAIGIGSATYKGYQAVALGASARISHNLKAKMGVGYSSSEGTTVGMGASYQW

5 SEQ ID NO: 15 (*Sinorhizobium meliloti*)

MALGRQSVSAGSGSLAFNGSYANSNGSVAIGQSAYAANVRAIAIGGDDAFWREAEQTKAGGSQSIAMGVRARTKSLVDDPDPTVAN
 EADPGGASDAIAIGTDAQANGDRSLAIGRQNOAGNEQSIGIGAGNTATGKLSIGIGSSNVASGEQSLSLGAGNNALGQGSISIGTETT
 AGGLRSIAFGVRASTKEANLDIPDDVAIDAIAIGTNTKANGDRSVSIGTGSQASSGAVSIGDAKAVGDKSVSIGTESWADGDESVS
 IGLVNNAGFEGNDRIKGGQTSVSLGAFNQSPGIEAIAIGARNEANADRSIAIGSRAKTKAADPAQADGGARDAVAIGTDALANDDRSI
 SIGWNSSTSLNDSISIGTRATSGSAGDIMIGTSGTGSTSGQNNVALGVAASQKVKGSSNIAIGDSAGGSREGDNNVAIGTNAGIQFS
 ESEHETAVRADLVVSDAVSIGNEALASADEAIAIGTGAVASGLKSSISIGVGNVSGASSGAIGDPTDITGTGSYSLGNDNTIAADNAG
 TFGNDNTLADAADGSRVIGNGNNDVSDAFVLGNGADVTEVGGVALGSGSVSDTGADVAGYVPGGASTADQNAIEATQSTRGAVAVGN
 PDAETGVYRQITGVAAGTADSDAANVAQLKSVETIAKTGWKLTTDSGSIDGIGPGDELVLKGGDGNIVISNQILSNDVSLADEIEV
 NRVTRDPDPTGASTVLDENGLSFTTQDANGEDTALGPRVTAAGIQAGKITNVAAGEADTDAVNFSQLRQVETASGNTDQRAVKYDWT
 DANTNGVIDEGLNLDVTLAGGMGGTRISNLAPGALSAASTDAVNGSQLFGLRSRVSNVAVALGGGAAYDPVKDEWIAPKYTIGGTD
 YSNVGDALAAVGGTAGAGWSLSAQGANASNVAPGETVDLRSGDGNIIVSKAETGDTVSEFDLADDLDVSESVTVGADPADPNAPTIVIT
 GGSIVIGSTMLGSLNGLVITGGPSVTTDGDAGGMKVTNVANGTVAKDSKDAVNGGQLFDVVAANATANGVGYDDKSKGTLTLEGANGTK
 ITNVAAGDLNANSTDAVNGSQLYATNVKVDRLDTEVKEIDSRVTYIESFQGDLENAAVYDTDAAGKRLNTLTLEGGDPDKPVLIANVA
 KGVKATDAVNVGQLDESVAESKSYTDEKTEWAIQAAIYTDQVIETKVSANVNYAQORFAQLSGEIGQVRSEARQAAAIGLAAASLRF
 DNEPGKLSVALGGGFWRSEGAALFAGAGYTSSEDGRVRANLTGAAAGGNVGVGAGLSITLN

SEQ ID NO: 16 (*Bradorhizobium japonicum*)

MRAFGSGNAINGTNYAAVGSNNVVAGNNGAVVGSNGVTGDNTAAFGSSIGIAGGNNAVGSFSTVTGSNSAAVGSFNNVSGNNSGAF
GTGQNIRGNGTFAIGDPNIVNGNNSLVFGDNNTVNGSNVAGRGDNIQLVGSNNTIAATSSAAGSSVFGSGNTVNATNAVVMGNNSSTVS
GASSVAIGNGTAVTGINAIAAMGTGAGANFDNSVAIGSGATTTRANQVAVGTASSTYMSGITSAASKAAQSGPTQLVTSDAAGNLATT
SLAGLGLASAGDINGINSQLAALNGRVDNLTRESRGGVALALAASSLQFDPRPGKISVSGGFGNFQGGQSLAVGLGYSYSDAMRFNAA
FTAAQQGAIGVRAGASWTLN

SEQ ID NO: 17 (*Burkholderia fungorum*)

MNKTYRSVWNESTGTWVAASEHASARGKKSSAKTSSTKAVVGALGLAAGLYGADAFALGGGLTLCPTTEGSAGYTAGSASSANGAYCG
SDYQWGLFSNTNADGSKSGQPIGAAIEGMNDGSLLLYGPNNIVMKNLVSMSSNKIINLAPGTVSSTSADAVNGSOLYATNQNVSNIGN
TVNNITTGAGIMYFHVNSTLADSTANGVNSIAIGGATRTDANNSISIGTGLTQASSNTGAIAGQNASINVYGANSIAIGTNSATGGI
GGAIALGENAFATGGKMLALGSGASATTANSVALGSGSTTTANLTAAGYNPGSGTLAGTSQATNGEVSVGNAGAERRITNVAAGSAAT
DAVNVSQLQSEDAKVNTINNNVNNLSGSVTNISSTVNNITNGGGIKYFHANSTQADSSATGTDAVAIGGNAQATAANSVALGLNSTSK
GTNAIALGGAVAGGSYAFAAGSLALAATTGDIALGSSATASSANSNAYATALGTNALANATDATAIGEASATAASSVALGARSKTTA
NLSTAGYNPGTGTLSTGTTPTGEVSVGSAGKERRVTNVAAGSAATDAVNVSQLMSEDAKVNTINNNVNNLSNNVTNIAGNVTNISNTVN
NITNGGGIKYFHVNSTLADSSAGGTNSIAIGGGATTGNVTAGTSDNISIGTNATTNYGKNIAIGGNAQALGGAYDGGYNTAIGENAIA
KGDGAGGFGGGGWWGQTTAIGGGSQALHDNTTAVGSGAIANVANATALGMSASATAGSAIALGQGAVASAANSVALGSGSTTTXNLSAA
GYNPGTGTLSGIASVANGEVSVGAAGKERRITNVAAGSAATDAVNVSQLQSEDAKVNTINNNVNNLSGSVTNISNTVNNITNGGGIKY
FHTKSTLADSSATGTDAVAIGGNAQATAANSVALGSNSTTTANLSAAGYNPGTGALSGIASAANGEVSVGAAGKERRITNVAAGSAAT
DAVNVSQLQSEDAKVNTISNNVNNLSGSVTNISSTVNNITNGGGIKYFHTNSTLADSTANGVNSIAIGGATRTDANNSISIGTGLTQA
SSNTGAIAGQNASINVYGANSIAIGTNSATGGIGGAIALGENAFATGGKMLALGSGASATTANSVALGSGSTTTANLTAAGYNPGSG
TLAGTSQATNGEVSVGNAGAERRITNVAAGSAATDAVNVSQLQSEDAKVNTINNNVNNLSNNVTNIAGNVTNISNTVNNITNGGGIKY
FHTKSTLADSSATGTDAVAIGGNAQATAANSVALGSNSTTTANLSAAGYNPGTGTLSTGTTPTGEVSVGSAGKERRVTNVAAGSAATDA
VNVSQLQSAIIGSTANAVAYDDGKTATVTLKGASGTKITNLTAGNLSATSTDAVNGSOLYATNQNVSNIGNTVNNITNGGGIKYFHAN
STQADSSATGSNSVAVGDRASSLGGSSVAMGDGATAVGAASIAIGNNAQNVTSNNSVAIGGDSKAGDRSVSLGNGADTSLSSWGVAV
GTNANVSAALGTAIGAGANVSGANSTAIGANAVASATNSVALGSNSTTTANLSAAGYNPGTGTLSGIASAANGEVSVGAAGKERRVTN
VAAGSAATDAVNVSQLQSEDAKVNTINNNVNNLSGSVTNISSTVNNITNGSGIKYFHTNSTLADSSAGGANSIAIGGGAATSSSAGLS
DNMAIGTNATASYGKNIAIGGGAQATGGTYDGGYNVALGENANATAGTNAWGHNTAIGANTVINGVNSVALGISATTSGSGSMAFGSA
AQASADYAIASGAGANASAVNSVALGSNSTTTANLSAAGYNPGTGTLSGIASVANGEVSVGSAGKERRVTNVAAGSAATDAVNVSQLQ
SEDAKVNTINNNVNNLSNNVSNIAAGNVTNISNTVNNITNGGGGIKYFHANSTLADSSATGTDAVAIGGNAQATAANSVALGSNSTTTA
NLSAAGYNPGTGTLSTGTPVGEVSVGSAGKERRVTNVAAGSAATDAVNVSQLQSAIIGSTANAVAYDDGKTATVTLKGASGTKITNL
AGNLSATSTDAVNGSOLYATNQNVSNVGNVTVSNLSNNVTNIAGNVTNISNTVNNITNGGGIKYFHANSTLADSSATGTDAVAIGGNAQ
ATAANSVALGSNSTTTANLSAAGYNPGTGALSATTPVGEVSVGSAGKERRVTNVAAGSAATDAVNVSQLMSEDAKVNTINNNVNNLSN
NVSNIAGNVTNISNTVNNITNGGSGIKYFHANSTLADSSATGVDVAIGGNAQATAANSVALGSNSTTTANLSAAGYNPGTGALSGIA
SAANGEVSVGAAGKERRITNVAAGSAATDAVNVSQLQSEDAKVNTINNNVNNLSNNVSNIAAGNVTNISNTVNNITNGGSGIKYFHANS
TLADSSATGTDAVAIGGNASASAANSVALGSNSTTTANLSAAGYNPGSAALSGTASAANGEVSVGAAGKERRITNVAAGSAATDAVNV
SQLQSEDAKVNAEGAATAAALGGGSTYNTTTGAITSPYIAGGKTFNNVGDVVTNIDGRVTQNSTDITNLTTTIDNGTIGLVQOATPT
STITVAKDTGGATVDFRGTGNATRTLGTITAGELSATSTDAVNGSOLYATNQNVSNIDNTVSNLSNNVTNIAGNVTNISNTVNNITNG
GGGIKYFHANSTLADSSATGVDVAIGGNAQATAANSVALGSNSTTTANLSAAGYNPGTGTLSGIASAANGEVSVGAAGKERRVTNVA
AGSAATDAVNVSQLQSEDAKVNTINNNVNNLSNNVSNIAAGNVTNISNTVNNITNGGGGIKYFHANSTLADSSATGTNSLAAGPAAVAS
ATDAVALGNKAKATNAGAVALGAGSTTTTAVATSGTTIGGITYTFAGVAPSSTVSVGAAGSERTITNVAAGRLSATSTDAVNGSELFA
TNQQVTRNTADITNLTNMNI GSVGLVQODATRTITVAKATDGTTRVDFGTGGRQLTGVAAGAVNATSVDAVNGSOLYGVQSQSVAD
AIGGGSTVNTDGSISAPTYVVDGTTVHNAGDAISNLDNRVTQNTTIDISTINNTLNSITTGAGVKYHVNSTLADSLAKGAESVAIGGN
AQSQAANSVALGSNSVADRANTVSVGAAGAERQITNVAAGTADTDAVNVAQLKASGVINTDGTNAAVTYDHNADGSANYNSVTMGNG
VAGGTTIHVAAGSAADDAVNVSQMNAAISSVSNIGSAGNPLFTADGNRDTEAAVASGTHATAMGANAKASAANSVALGANSVADRE
NTVSVGSAGNERQVTNVAAGTATDAVNVGQLNQAIGASIGNLPAGMSAKDYTDQQINAVQNGVNVQAKNAYAGIAAATAALTMIPDVD
QGKTIAVGVGGGSYKGSQAVALGISARITQNLKMKAGAGTSSQGTTVGLGASYQW

SEQ ID NO: 18 (*EPEC*)

MLIQONSEVINQLAGNTSETYIEENGASINYVRTNDTGLTFTDASAAGIGSTAVGYNTVAKGDNVAMGYNSFAEGHSSVAIGQGSYS
GVETSIALGSESVSSRVIVKGSRNSTSVSEEGVVIGYDTTDGELLGALSIGDDGKYRQIINVADGSEAHDAVTVRQLQNAIGAVATTPT
KYYHANSTAEDSLAVGEDSLAMGAKTIVNGNAGIGIGLNTLVLADAINGIAIGSNARANHADSIA MGNGSQTRGAQTNYTAYNMDAP
QNSVGEFSVGSSEDGQRQITNVAAGSADTDAVNVGQLKVTDAQVSQNTQSITNLNTQVTNLDTRVTNIENGIGDIVTTGSTKYFKTNTD
GVDANAQ GKDSVAIGSGSIAAADNSVALGTGSVANEENTISVGSSTNQRRITNVAAGVNATDAVNVSQLKSSEAGGVRYDTKADGSID
YSNITLGGGNGGTTTRISNV SAGVNNNDVNVAQLKQSVQETKQYTDQRMVEMDNKLSKTESKLSGGIASAMAMTGLPQAYTPGASMAS
IGGGTYNGESAVALGVSMVSANGRWVYKLQGSTNSQGEYS AALGAGIQW

SEQ ID NO: 19

GSGGGG

SEQ ID NO: 20 (*Haemophilus aegyptius*)

GTACCGCACGAGCTGGCAAAAAGGCACGGCAGTCTCTTTTGTCTGAAGCCCATGATTACAAGTTGCTAGGTAAAATCAAACGTTATAC
 TGAGGAAATTTTAAAGGCACGCATTTTAGCAGGTTTAGAACCTCGCACTAAGCCACCAAAAGATGGCGAAGTGAAATCTGTCAGCAAA
 AAACAAAAGGCGCGCATTAAAGAAAAACGTGAAGATAAGAAAAAACAGAGGCCAAAGAAAAAGTAAAATTGCGTCATAAGGATACAA
 AAAATATCGGCAAACGACGCAAGCCAAGTAATAGTAATATTTAATTAGGTATGATGTAAATTCTGCTTGAGGCCAAATTTTACATAGGA
 AATTTTTCTATATTGCTTTAACGTTTTTTTTATAGTAGAAGTATATACTCAGTTATGGTTATGGTTACATAGTATAGTTTTACTTTGTT
 CTAGTTCACTTTAAATAACCTTAAATAATTGAGGATTTCTTATGAAAAGAAATTTATTAAAACAATCTGTAATCGCTGTGTTGATAGGT
 GGCCTACTGTTTCTAATTATGCTTTAGCACACAAGCACAAGCACAAGCACAAGTCAAAAAGATGAACTTAGTGAGTTAAAGAAACAAG
 TAAAGGAAATGGATGCTGCTATCGATGGTATTCTTGATGATAATATTGCTTATGAAGCTGAAGTTGATGCAAACTTGATCAGCATTC
 TGCTGCTCTTGGTAGACATACAAATAGACTCAATAATCTTAAACGATTGCAGAGAAAGCAAAGGTGATTCAAGTGAAGCACTTGAT
 AAAATTGAAGCTCTTGAAGAACAAAATGATGAGTTTTTAGCGGATATTACAGCTTTAGAAGAGGGAGTTGATGGTTTAGATGATGATA
 TCGCAGGTATTCAAGATAATTTTCTGATATAGAAGATGATATTAATCAAATCTGCAGACATCGCACTAACACAGCGGCAATCGC
 AACTCACACTCAACGTCTTGATAATTTAGATAACAGAGTAAATAACCTTAATAAGATCTTAAACGTGGTCTTGCTGCTCAAGCTGCA
 TTAAATGGTTTATTCCAACCGTATAACGTAGGTAAATTAAATCTTACTGCTGCTGTAGGTGGTTATAAATCTCAAACCTGCAGTTGCTG
 TAGGTAC

SEQ ID NO: 21 (*Haemophilus somnus*)

ATGAAAAAGTACAATTTTTTAAATATTCATCATTGGCATTAGCATTGGGTTTAGGGGTAAGTGCTTCTGCTTTGGCAGCCCCAACAA
 GTACAAGTACGACTACTGGACCAGAGGCGCCTCCTACAGGCCCTGCTCCTACGGCGAAAGACCCTCTAGCAGAAACAGCGTTAGCCTA
 TGATTTGGAGAACGAAGTTGCGTATCTTCGTATGAAGGCGGGTGAGTGGATGCAATTGGGGCTTGATCCTGAAAAAGAAGTCATCAAA
 GGCTGGAATGAGGTAAATCTCTCCCTCGTATCGATGGAAATGGAAAGGATAAACAGACAAAAGATCAAATAGCAATGTTGATAAGAA
 CGGTTGATAATACAAAAGAGCTTGGTCGGATCGTTAGTACAAACATTGAAGATATTAAGAACCCTTAAAAAGAGCTTTACGGTTTTGT
 AGAAGATGTGAACGAGAGTGAAGCACGCAATATCTCAAGAAATAGATGAGAATGAGAAAGATATTAAGAACCCTTAAAAAGAGCTTTAC
 GATTTTGTAGAAGATGTGAACGAGAGTGAAGCACGCAATATCTCAAGAAATAGATGAAAATGAGAAGGACATTAATACTCTTAAAGAGC
 TAATGGATGAGGATTTAAATTCAGTCTTAACCCAAATTGAAGATGTAAACTCACATTTCAAGATGTCAATGATAACGTTAATTTGGC
 ATTTGAAGAGATTAATGGAAATGCCCAAAGTTTGACACTGCTATTGAAGGACTTACTTCAGGTTTGAGCGATTTACAAGCTAAAGTC
 GATGCAAATAAACAAGAACTGAAGACGATATTGCGGACAATGCCAAGGCTATTCATAGCAACACAAAAGGTATTGCTAAAAATACCA
 AGGATATTCGTGACTTGGACACCAAAACCAAGCAAATGTTGGAAATGACAAAACTTGATGACCGGTTTAGAATCTTTAGCAACAGA
 AACAAGCAAAGGCTTTGAAAGATTTGATGTCAAACACAACAATTAGATCAAGCCGTCGCAAATGTCGTGGTTCGAGTAGACATAACT
 GAGCAAGCTATTCGCCAAAACACTGCAGGCTTAGTCAATGTGAATAACGTGTGATACACTCGACAAAAACACCAAGCCGGTATCG
 CTTCTGCAGTCGCTTTAGGTATGTTGCCACAATCCACTGCTCCGGGTAAATCATTAGTGAGCTTAGGTGTCGGTCATCACCGTGGGCA
 AAGTGCTACTGCTATTGGAGTATCTTCTATGAGCAGTAACGGTAAATGGGTGTTTAAAGGCGGTATGAGCTATGATACACAGCGTCAT
 GCTACTTTCCGGCGGTTCTGTCGGTTTTTTCTTTAACTAA

SEQ ID NO: 22 (*Escherichia coli*)

ATGAAACTGTAAACGTAGCTTTACTGGCACTCATAATTCAGCAACATCCAGCCCTGTTGTTTTAGCTGGTGATACCATTGAAGCGG
 CGGCAACAGAGCTTTCAGCCATTAACCTCTGGCATGTGCAATCGGAGATTGAGCAGAAGATTACCCGCTTTTTAGAACGCACAGACAA
 CAGCCCCGCTGCGTATACCTATTTGACTGAACATCACTACATCCCTTCTGAAACACCTGATACCACTCAGACTCCCACTGTCCAGACA
 GATCCTGACGCAGGACAAAAAACCGTTGCCGCTACAGGTGATGTACAGACAACCTGCCCGTTATCAGAGCATGATCAACGCCCCGACAGT
 CTGCGGTAACCTGACGCCCAGCAAACGCAAATTACAGAGCAACAGGCGCAGATCGTAGCCACACAAAAACGCTCGCCGCGACTGGAGA
 TACGCAAAATACCGCGCATTATCAGGAAATGATTAATGCCAGACTGGCGGCTCAAATGAGGCTAATCAGCGCACCGCCACTGAACAA
 GGGCAGAAAATGAATGCGCTGACAACCGATGTGGCAGTACAACAGCAAAATGAAAGGACTCAATACGATAAACAAATGCAAAGTCTGG
 CGCAGGAGTCTGCCCAGGCACATGAACAAATTGACAGCCTGTCACAAGACGTAACCCAAACGCACCAACAGTTAACCAACACCCAAAA
 ACGGGTTGCAGATAACAGCCAGCAAATTAACACGCTCAATAACCATTTAGTTTCGCTAAAAACGAAGTTGATGACAATCGTAAAGAA
 GCCAATGCGGGAACCTGCATCTGCCATCGCTATCGCCTCACAACCACAGGTTAAAACCGGTGACGTGATGATGGTGTGAGCGGGAGCGG
 GAACCTTCAACGGTGAATCTGCGGTGTCTGTGCGGAACATCATTTAATGCCGGAACGCATACGGTACTTAAAGCCGGTATTTCTGCGGA
 TACACAATCTGATTTCCGGCGCAGGTGTGCGCGTGGGATATTCGTTCTAA

5 SEQ ID NO: 23 (*Escherichia coli*)

ATCGCCAAACAGCGTCGGCGTCTGGGCGCAGTAAGAGACTTGCTGACGGTAGATTTCTGGCTTTAGTGTGCTGACATCCTCACCTTCA
 AACAGTAACGTTCCGCTGGTTGGGCTGATCAATGAAGCAACTATTTTTCAGCAGCGTACTTTTGCCACAACCAGAAGGACCGGTAAATTA
 ACTTAAATTCGCCAGCAGCAGCGAAAAATTGATGTTATTAAGAATCTTCGCATCACCCGCCAGATATCCTACGTTTTGTAGCTGAAG
 CAAAGGACTATTTTCTGTCATCGCTGTTCCCTTTTTCTGATTTTTACTAAAAACAGTTTATCCTTCGCAGGAATAAGGGGGAACCTCTC
 TTTTCAGTAATCAGGTATAATTTGTTTAAATCAAGCAGCAATTTGCTGATTATGGACGGTACAACAGGAGGTTTTCCGATGCTTATCT
 TTATCCCGATTCTCATTTTTGTGCGCGTGGTCATTGTGCGGCGGGCGTCAAATCGTGCCGCGAGGGCTATCAATGGACGGTAGAACG

TTTTGGTCGCTATACCAAACGTTACAGCCGGGGCTCAGTCTGGTGGTGCCGTTTATGGATCGCATTGGTCGCAAGATCAATATGATG
GAGCAAGTGCTCGATATCCCTTCCCAGGAAGTTATCTCGAAAGATAACGCCAACGTTACCATCGACGCAGTCTGTTTTATTCAGGTGA
TTGACGCGCCACGCGCGGCTTATGAAGTCAGCAATCTGGAGCTGGCGATCATCAACCTGACCATGACTAACATCCGTACCGTGTTGGG
TTCAATGGAACCTTGACGAAATGCTCTCTCAGCGCGACAGCATCAACTCACGCCTGCTGCGTATTGTGATGAGGCCACCAACCCGTGG
GGGATTAAAGTCACCCGTATTGAAATTCGCGACGTGCGCCACCGGCAGAGCTTATCTCTTCAATGAACGCGCAGATGAAAGCGGAAC
GTACCAAACGCGCTTACATTCTTGAAGCGGAAGGGATCCGTACGGCGGAAATCCTCAAAGCCGAAGGTGAAAAACAGTCGCAAATCCT
GAAAGCGGAAGGCGAACGTCAGTCGGCGTTTTTACAGGCTGAAGCGGTGAACGTTCCGCTGAAGCAGAAGCCCGCGCCACCAAAATG
GTGTCTGAAGCCATCGCCTCCGGTGATATTAGGCGGTGAACTACTTCGTAGCGCAGAAATACACCGAAGCGTTACAGCAGATCGGTT
CCTCCAGTAACAGCAAAGTAGTGATGATGCCATTAGAGGCCAGCAGCCTGATGGGGTCGATTGCCGGGATTGCCGAGCTGGTGAAAGA
CAGCGCCAACAAGCGGACTCAGCCATGATGGAGTTAATAGTCGTTTCATCCACATATTTTCTGGCTCAGTCTCGGCGGTTTTGCTGCTGG
CAGCCGAGATGCTGGGCGGAAATGGTTATTTGTTGTGGAGTGGCGTGGCAGCAGTGATTACTGGCCTGGTGGTCTGGCTGGTGCCGCT
GGGTTGGGAGTGGCAAGGGGTGATGTTTGCCGTCCTGACGCTGCTCGCCGCTGGCTGTGGTGGAATGGTTGTGCGGCGGGGTGCGC
GAACAAAAGCACAGCGACAGTCATTTAAACCAGCGCGGGCAGCAGCTGATTGGCCGACGTTTTGTGCTGGAATCTCCGCTGGTCAACG
GGCGCGGTTCATATGCGCGTCGGTGACAGTTTCATGGCCTGTCAGCGCCAGCGAGGATCTCGGCGCAGGTACGCATGTTGAAGTCATTGC
GATAGAAGGGATAACGCTGATCATCCGTGCGGTTCATCGCCTGATGCGACGCTGACGCGTCTTATCATGCCCGGAAGTCTGCGCCCGAA
TCGTAGGCCCGGATAAGGCGTTTTACGCCGCATCCGGCAGTCGTGCACCGACGCTGATGCGACGCGGGCGCGTCATATCACGCCAAAAC
CGTAGGCCCGCTCCGCCATGTTAAATGTTAACTGGCATTGGCAATTTACTCTTCCCGGCCTTTACTCATACTTTTTTGGTCTTTCATCC
GGATAGTGTTTTTTTAGATATTCCAGGACGTTTTTATTGACCTTGTGTTGCGTATACACCCACCCTTTCCAGTAATCAGGCTGGTCCA
GGTAAACTTCTGGCGGAATGGTGAAATCAGAAAGCGTTAACCATTCCGGCTAACAGATCGGGGTTTTGTTTTCTGTATCAACTGCAACAG
CATAATCAGCGACATGGCAGAGGAGGAGCCGTACTATCGCCGCTTAAATACTTCCACACTGTCGACCGGTTTCAACGAAAAAGGATC
GGTAGCAATGCCCGGTCCAGATTCATTTTCAATTAATAATCTTCTCAAATTCATTCATTTAAATTTTCTGCTGGCGTAAACCTCTTAA
AAATTGAGATTTATCAAAGAAACGCATTTTAGCACACATCAGGAACCGCTTCACGTTTAGTCCAGAAACAGAAATTTATTTGCTTATC
AAAACAAGTCTTTACTCTTTTTTACATTGAAAGAGCACGAAATGATTTCTTTTTTATTTATATAAGAAACCATTTTTGTTTCTTATT
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TTTCTTAAACAATATTATTTGTTTCTTATAGAAACATTAATACGACTTATTTTGAACAAGAGAAAATGAATGAAAACGTAAACGTA
GCTTTACTGGCACTCATAATTTAGCAACATCCAGCCCTGTTGTTTTAGCTGGTGATACCATTGAAGCGGCGGCAACAGAGCTTTAG
CCATTAACTCTGGCATGTGCAATCGGAGATTGAGCAGAAAGATTACCCGCTTTTTAGAACGCACAGACAACAGCCCCGCTGCGTATAC
CTATTTGACTGAACATCACTACATCCCTTCTGAAACACCTGATACCACTCAGACTCCCACTGTCCAGACAGATCCTGACGCAGGACAA
AAAACCGTTGCCGCTACAGGTGATGTACAGACAACCTGCCCGTTATCAGAGCATGATCAACGCCCGACAGTCTGCGGTAACCTGACGCC
AGCAAACGCAATTACAGAGCAACAGGCGCAGATCGTAGCCACACAAAAACGCTCGCCGCGACTGGAGATACGCAAAAATACCGCGCA
TTATCAGGAAATGATTAATGCCAGACTGGCGGCTCAAAATGAGGCTAATCAGCGCACCGCCACTGAACAAGGGCAGAAAATGAATGCG
CTGACAACCGATGTGGCAGTACAACAGCAAAATGAAAGGACTCAATACGATAAAACAAATGCAAAGTCTGGCGCAGGAGTCTGCCCAGG
CACATGAACAAATTGACAGCCTGTCAACAAGACGTAACCCAAACGCACCAACAGTTAACCAACACCCAAAAACGGGTTGCAGATAACAG
CCAGCAAATTAACACGCTCAATAACCATTTAGTTTCGCTAAAAACGAAGTTGATGACAATCGTAAAGAAGCCAATGCGGGAACTGCA
TCTGCCATCGCTATCGCCTCACACCACAGGTTAAAACCGGTGACGTGATGATGGTGTGAGCGGGAGCGGGAACCTTCAACGGTGAAT
CTGCGGTGTCTGTGGAACATCATTTAATGCCGGAACGCATACGGTACTTAAAGCCGGTATTTCTGCGGATACACAATCTGATTTGCG
CGCAGGTGTGCGCGTGGGATATTCGTTCTAATATTTCAATCCTCAATATAAATAAGAGCAAGGAAGCTTGCCGGGTTACCTCTTCAT
TAATTTGTACATTATTTAAGGTTAACAATGATGAATAGCTCCATTAAATCGTTTTCCCTGCTGGCGGTATATTACTGGCTGGCTGTA
GTTACCCACTTCCCGCATCGCAGATTGCCAGGCGCAGGGCGTCAGTCATGACACCTGTTACCTCGCAGAACAGCAGCGTCAGGCGGC
TATTTTAAGTGATCCGAGGCACAGGCATTTAAAAATGCAGAAGCCGCACAACACGCCCAGGCGGCAAGAAAGCCATTTATAAGGA
TTTTGGCATGACCTTTAGAAATGAGCAGTAAAACTTTGCTTATCTCAATGATTCATTATGTGCAATTGATGAAGACAATAAGATGCCA
CTGTTTATCAGTCAGGTCTATATAACGTCATTGTTTATCATCACACAGGAAAAGTCGCCTTAATGAAAGAAGGCCAGTTTGTGGGTTA
TTTAAAAATGAAGGAGCAAGGAAAATACCCCTGACGCATATTATGATTATCGGTGCGTTTTATTTTTGCCTTCTTGCAAGTAGTATTAT
TAGCCTCCCTGGTTCACGCTGTGAATGTTAACAACGAAATCCAGGAAGGCTTATTTAGTCGGGGCGCATTATGGTAGAAAGTTTGCA
GCATATTCTTTGCGGTGCAAACGGGGATTCACTGATTTTCACCCCGCCGATGATGACAGCAGCCGGAGAGATTTTCGATAATCGGGCA
GTCGGCGCTGTATACCGGGGCAGGCATTGCCAGCGCCAGTAGCTGGTTGCGCATAGATTGCAGTTCTTCGATATGCCGTTCAATC
TCCGCCACCTTCTCAGCGTGCGACGTTTGACGTGGGCACTGTGACGCTGCGGGTCGTTAAACAGATTCACCAGCTCGCCGCTCTCTT
CCAGGTAAAGCCCACCTGGCGCGCCTGGCGCAGTAAGGTCAATTCGTTGAGATGCTGCTGCGTGTAGGTTTCGATAACCATTTTTGCT
GCGCATCGGCGGCGTCACCAGCCCCTTCTCTTCATAGAAGCGAATGGCTTTGCTGGTCAGGCCGGTAATTTTTGCTACATCGCTAATG
TTCATCGTTGCGCAACGCC

SEQ ID NO: 24 (EPEC)

ATGAAAACGTAAACGTAGCTTTACTGGCACTCATAATTTAGCAACATCCAGCCCTTTTGTTTTAGCTGGTGATACCATTGAAGCGG
CGGCAACAGAGCTTTAGCCATTAACTCGGGCATGTGCAATCGGAGATTGAGCAGAAGATTACCCGCTTTTGAACGCACCGACAA
CAGCCCCGCTGCATATACCTATTTGACTGAACATCACTACATCCCTTCTGAAACACCTGATACCACTCAGACTCCCCCTGTCCAGACA
GATCCTGACGCAGGACAAAAACCGTTGCCGCTACAGGTGATGTACAGACAACCGCCCGTTATCAGAGCATGATCAACGCCCGACAGT
CTACGGTAACTGATGCCAGCAACGCAATTACAGAGCAACAGGCGCAGATCGTAGCCACACAAAAACGCTCGCCGCGACTGGAGA

TACGCAAAATACCGCGCATTATCAGGAGATGATTAATGCCAGGCTGGCGGCTCAAAATGAGGCTAATCAGCGCACTACCACGGAACAA
GGGCAGAAAATGAATGCACTGACAACCGATGTGGCAGCACAAACAGCAAAAAGAAAGGGCTCAATACGATAAACAAATGCAAAGTCTGG
CGCAGAAGTCTGTCCAGGCACATGAGCAAATTGAAAGTCTGAGACAAGATTCGCGACAAACGCAGCAACAGTTAACCAACACCCAAAA
ACGGGTTGCAGATAACAGCCAGCAAATTAACACGCTCAATAACCATTTTCAGTTTCGCTAAAAAACGAAGTTGAGGACAATCGTAAAGAA
GCCAATGCGGGAACCTGCATCTGCCATCGCTATCGCCTCACAACCACAGGTGAAAACCGGTGACTTGATGATGGTCTCAGCGGGAGCGG
GAACCTTTAACGGTGAATCTGCGGTGTCTGTGCGAACATCTTTTAATGCCGGAACGCATACGGTACTTAAAGCAGGTATTTCTGCGGA
TACACAATCTGATTTTCGGTGCGGGTGTGCGCGTGCGGATATTCGTTCTAA

SEQ ID NO: 25 (EAEC)

ATGAAAACGTGTAAGCTGTCTTTACTGGCTGTCTGTTGTTGCTACCGCGGTAAGTCCATCTGCGTTTTCGGGGTGATACTGTTGAGGCGG
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TAGTGTAGCCGCACAAAATTATCTGATTGCGCATGATTACCAGACAACGACGCCTCAGGAAAATACAGCTGCTTCTCCCGTACAGCCC
ACCAATACGCTGAACCCGATAACCAATCAAGCGCAGACCGACCGCGACAACGGGCAGGATACCGCCATTCAGGACGCGCAGCAGCCG
CCAACCTGGGCTTCACTGAAAGCTGATGACGCGCAGCACGCCATCACGGTGGCGCAGACGGATATTGATGCCAATACAGCCGCCATCAC
CGATACCCGTAATGATGTCTCCGCACTGCAGTCAGACGTCACCAACATAAAAGGCGATGTGCGCACATGCCCAGTCAACGGCTGACCAT
GCCAACGCTAACGCCAACACCGCTCTGATTAACGGCGTCAAACCTTCCGGTGCTGTGACAGAAAACAAAACAACATCGAACAGAAC
GCAGCGATATTGCTGACCAGCAGAACTGTTGGCATCAAACGAGCAAAAACAGATCGTCCGCGACAACGGGCAGGATACCGCCATTCA
GGACGCACAACATGCCGCCAACTGGGCTTCACTGAAAGCTGATGACGCGCAACACGCCATCACGGTGGCGCAGACGGATATTGATGCC
AATAAAGCCGCCATCACCGACATCCGTAATGATGTCTCCGCACTGCAGTCAGACGTCACCAACATAAAAGGCGATGTGCGCACATGCC
AGTCAACGGCTGACCATGCCAACGCTAACGCCAACACCGCTCTGATGAACGGCGTCAAACCTCTCCTCTGCTGTGACAGAAAACAAAA
TAATATCGAACAGAACCGCAGCGATATTGCTGACCAGCAGAACTGTTGGCATCAAACGAGCAAAAACAGATCGTCCGCGACAACGGG
CAGGATACCGCCATTACAGGACGCACAACATGCCGCCAACTGGGCTTCAATGAAAGCTGATGACGCGCAGCAGCCATCACGGTGGCGC
AGACGGATATTGATGCCAATAAAGCCGCCATCGCCGACACCCGTAATGATGTCTCCGCACTGCAGTCAGACGTCACCAACATAAAAG
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GTGACAGAAAACAAAATAATATCGAACAGAACCGCAGCGATATTGCTGACCAACAGCAACAACCTCGACGAAACCCGAAAATCGTTG
CCGCCACCGGGGATGTGCAGACTGCCGCCGATATCAGAGCATGATTGACGCCAGACAGACAGCCGCTGCCAATGCGCAACAGGCACA
AGCTGACACCCAGCAGCAACAAATGGACGATCAGCAGAAACAAATCGACGCGACGCAAAAACGGTTTCCGCACTTGGCGATGCCAG
ACCAACGCACATTATCAAGAGATGGTTAACGCCGGACTGAGAGCACAAAATGATGCGAATGCGCGTACTGCAGCAGAACAAAACAAA
AAATAGATACTCTGGCGACTAACCCAGGCAACGCAACAGCATATCAATAGTGTGAGTACGGGGAACAAATTCAGCGTCTGGCGCAAGA
CTCAACACAAACGCATGAACAAATTGACAGCCTGACACAAGACGTAACCCAAACGCATCAGCAGTTAAGCAACACGCAAAAACGAGTA
GCGGATAATAGCCAGCAGATTACTACGCTCAATAACCATTTTCAGTTTCGCTGAAAAACGAAGTTGAGGACAACCGTAAAGAAGCCAATG
CGGGAACCTGCATCAGCCATCGCTATCGCCTCACAACCACAGGTGAAAGCCGGTGACTTTATGATGATGTGACGCGGAGCGGGAACCTT
CAACGGTGAATCTGCGGTGTCTGTGCGAACATCTTTTAATGCCGGAACGCATACCGTGATTAAGCCGGTGTCTCTGCGGATACGCAA
TCTGATTTTCGGCGCGGGTGTGCGCGTGCGGATATTCTTTCTAA

SEQ ID NO: 26 (UPEC)

ATGAACAAAATATTTAAAGTTATCTGGAATCCGGCAACAGGCAGTTACACCGTTGCCAGCGAAACGGCGAAGAGCCGTGGTAAAAAAA
GCGGGCGCAGTAAGCTGTTAATTTCTGCACTGGTTGCGGGTGGGTTGTTGTCGTCGTTTGGGGCAAGTGACAGATAATTACACTGGGCA
GCCAATGATTATGGCGATGGCTCAGCAGGTGACGGCTGGGTTGCTATCGGTAAAGGGGCAAAAGCAAATACCTTTATGAACACTAGT
GGCGCGAGTACAGCTTTAGGATATGACGCGATAGCCGAAGGTGAGTACAGTTCTGCCATCGGGTCAAAAACCCCTTGCAACTGGTGGAG
CATCCATGGCGTTTCGGGGTTAGTGCAAAAGCAATGGGTGACAGAAGTGTGCGCTAGGTGCATCGTCAGTAGCAAATGGCGATCGTTC
GATGGCTTTTGGTTCGTTACGCAAAGACGAATGGTTTTACATCTCTTGCTATTGGGGACTCCTCCCTTGCCGATGGTGAAAAAATATT
GCGTTAGGAAATACGGCTAAAGCTTACGAAATTATGAGCATCGCCCTCGGTGATAATGCCAATGCGTCAAAAGAGTATGCAATGGCGC
TGGGAGCAAGTAGCAAAGCTGGCGGTGCTGATAGCCTCGCATTCCGGCAGAAAATCTACAGCTAATAGCACTGGCTCACTGGCAATAGG
TGCTGACAGTAGCAGTTGCAACGATAACGCCATCGCGATAGGGAACAAAACGCAAGCCCTGGGAGTGAATTCGATGGCCCTGGGTAAT
GCAAGTCAGGCATCTGGCGAATCCAGTATTGCATTAGGTAACACCAAGTGAAGCCAGCGAACAAAATGCGATTGCGCTGGGGCAAGGTA
GCATTGCAAGCAAAGTGAACCTCAATCGCGTTGGGAAGTAACAGTTTGTCTCGGGAGAGAATGCCATCGCATTGGGAGAGGGTAGTGC
CGCTGGTGGCAGCAACAGCCTTGCTTTCCGGTAGCCAGTCCAGGGCAAACGGCAATGATTCTGTGCGCATCGGTGTAGGGGCTGCAGCA
GCGACCGACAATTCTGTGCTATCGGCGCAGGATCGACCACAGATGCAAGCAATACGGTTTCAGTTGGCAACAGCGCAACAAAACGCA
AAATTGTTAATATGGCTGCTGGTGCCATAAGCAACACCAAGTACCGATGCCATCAACGGCTCACAGCTTTATACGATCAGTGATTGAGT
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AACGTGGGTGATGCTCTGTGAGGAATCGACAATAATACCCTACAATGGAATAAAACCGCGGGGGCGTTTCAGCGCCAATCACGGTGCAA
ATGCCACCAACAAAATCACTAATGTTGCTAAAGGTACGGTTTCTGCAACCAGCACCGATGTAGTAAACGGCTCTCAATTGTACGACCT
GCAGCAGGATGCTCTGTTGTGGAACGGCACAGCATTGAGTCCGCGACACGGCACCGAAGCCACCAGCAAAATCACTAACGTCACCGCT
GGCAACCTGACTGCCGGCAGCACTGACGCCGTTAACGGCTCTCAGCTCAAACCACCAACGACAACGTGACGACCAACACCAACA
TCGCCACTAACACCAACCAATATCACCAACCTGACTGACGCTGTTAACGGTCTCGGTGACGACTCCCTGCTGTGGAACAAAGCAGCTGG
CGCATTACAGCGCCGCGCACGGCACCGAAGCCACCAGCAAAATCACCAACGTACCGCTGGCAACCTGACTGCCGGTAGCACTGACGCC

SEQ ID NO: 27 (EHEC)

-8-

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SEQ ID NO: 29 (*Burkholderia fungorum*)

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CAAGTACTTCCACGCGAACTCGACGCTGGCGGATTCGTGCGCGACGGGCACCAACAGCCTGGCGGCGGACCGGCAGCGGTGGCATCC
GCCACTGACGCGAGTCGCACTGGGCAACGGCGCGAAGGCAACCAACGCCGGCGCGGTGGCACTCGGCGCAGGTTGACGACAACGACCG
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SEQ ID NO: 30 (EPEC)

ATGCTGATCCAGCAGAACAGCGAAGTCATCAATCAGCTTGCCGGTAACACCAGTGAAACCTACATCGAAGAAAATGGTGCAAGTATTA
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SEQ ID NO: 31 (Shigella)

ATGAACAAAATATTTAAAGTTATCTGGAACCCTGCGACAGGGAATTATACTGTTACCAGCGAAACGGCAAAAAGCCGTGGCAAGAAAT
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SEQ ID NO: 32 (*Brucella melitensis*)

ATGTCTTTTTTTTAAAAAAATATATCGATAACAGCCATGGGTGGCTTGATGTTGTGCTTGCAGTCGACGCTGCGAAGGCGGAGGAAA
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SEQ ID NO: 33 (*Brucella suis*)

ATGTCTTTTTTTTAAAAAAATATATCGATAACAGCCATGGGTGGCTTGATGTTGTGCTTGCAGTCGACGCTGCGAAGGCGGAGGAAA
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SEQ ID NO: 34 (*Ralstonia solanacearum*)

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SEQ ID NO: 35 (*Sinorhizobium meliloti*)

GTGGCGCTGGGACGCCAATCGGTCTCGGCCGGCAGCGGTTCACTTGCAATTCGGTAACGGTAGTTACGCGAATTCAAACGGATCGGTTG
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GGGAGGACACGGCGCTCGGCCCGCGGTGACGGCGGCGGGCATCCAAGCGGCCGGCAAAATCACCAATGTCTGCTGCGGGCGAGGCCGA
CACCGACGCGGTGAACTTTTCCAGCTCAGGCAAGTCGAGACCGCATCGGGCAATACCGACCGAGCGGGCGGTCAAATATGACTGGACC
GACGCCAATACGAATGGCGTGATCGATGAGGGCGAACTCAACCTCGATAGCGTGACCCTTCCCGGGGGCATGGGCGGCACCGAGGATCT
CCAATCTTGGCCCCGGCGCTTGAGCGCGGCATCGACCGATGCCGTCAACGGCAGCCAGCTCTTCCGGGCTTCGACGCCGCGTATCCAA
CGTGGCCGTCTGCCCTGGGCGGGGAGCCGCTATGACCCTGTCAAGGATGAGTGGATCGCCCCGAAATACACGATCGGCGGCACCGAC

TACAGCAATGTCGGCGACGCGCTGGCGGCGGTGGGCGGCACGGCCGGTGCCGGCTGGAGCCTCTCGGCGCAGGGTGCGAACGCGTCCA
 ATGTCGCGCCGGGCGAGACGGTGGATCTTCGCGAGCGGCGACGGCAATATCGTCGTACGCAAGGCGGAGACCGGCGACACCGTGAGCTT
 CGACCTGGCCGACGATCTGGACGTCTCCGAAAGCATCACGGTGGGTGCCGATCCCGCCGATCCGAATGCGCCGACCACTGTTATCACCC
 GCGGTTTCGATCGTGATCGGCAGCACCATGCTCGGCAGCAACGGCCTGGTCATCACCGGGGGGCGAGCGTCACGACCGATGGCATCG
 ATGCCGGCGGCATGAAGGTCACGAATGTGGCAAACGGTACGGTGGCGAAGGATTCGAAGGATGCCGTCAACGGCGGCCAGCTCTTCGA
 CGTCGTTCGCAATCCCACTGGCAATGGCGTTCGGCTATGACGACAAAGCAAGGGCACCCCTGACGCTGGAGCGGGCTAACGGCACCAAG
 ATCACCATTGTCCTTCCGACCTGAACGCGAACTCCGACCGACCGCTCAACGGCAGCCAGCTTTACGCCACGAACGTGAGGCTCC
 ATCGGCTCGATACCGAAGTGAAAGAGATCGACAGCCGCGTAACCTATATCGAGAGCTTCAGGGCGATCTGGAGAACGCTGCCGTCTA
 TGATACCGACGCTGCCGGCAAGAGGCTCAACACGCTGACGCTCGAGGGAGGAGATCCCGACAAGCCGGTGCTCATCGCCAATGTGGCC
 AAGGGCGTGAAAGGCGACCGACCCCGTCAATGTGCGCCAGCTCGACGAAGCGTCCCGGAAAGCAAGAGCTACACGGACGAAAGACCG
 AGTGGGCGATCGATCAGGCGGCCATCTACACCGACAGGTTATCGAGACCAAGGTGAGCGCGGTGAACAATTATGCGCAACAACGGTT
 CGCGCAGCTCTCGGGCGAGATCGGGCAGGTTCCGAGCGAAGCGCGGCAAGCCGCCCATCGGACTTGCGGCGGCCTCGCTGCGCTTC
 GACAATGAGCCGGGCAAGCTGAGCGTGGCGCTCGGCGGCGGCTTCTGGAGAAGCGAAGGGGCGCTCGCCTTCGGTGCCGGCTACACCA
 GCGAAGACGGACGCGTCCGGGCGAACCTGACCGGTGCTGCGGCCGGGGGAACGTGGTGTCGGTGCCGGCCTCAGCATCACGCTCAA
 CTGA

SEQ ID NO: 36 (*Bradorhizobium japonicum*)

GTGCGGGCCTTCGGCTCCGGCAACGCCATCAACGGCACCAACTACGCGGCCGTTCGGCTCCAACAACGTCGTGCGCGGCAACAACGGCG
 CGGTTGTGCGCTCCGGCAACGGCGTCACCGGCGACAACACCGCGGCCTTCGGCTCCAGTATCGGCATCGCCGGCGGCAACAACGGCGC
 TGTGCGCTCCTTCAGCACCGTCACCGGCAGCAACAGCGCGGCTGTTGGCTCCTTCAACAACGTCAGCGGCAATAACAGCGGCGCCTTT
 GGCACCGGACAGAACATCCGCGGTAACGGCACGTTCCGCATCGGCGATCCCAACATCGTCAACGGCAACAACAGTTTGGTGTTCCGGCG
 ACAACAACACGGTGAACGGGTCCAATGTGGCGGGTTCGCGGCGACAACATCCAGCTGGTTCGGCTCGAACAACACCATTGCGGCAACGTC
 CAGCGCCGCGGCTCATCCGTGTTCCGGCAGCGGCAACACCGTCAACGCCACCAATGCCGTGGTGATGGGCAACAACAGCACCGTCTCC
 GCGCGTCCTCTGTGCGGATCGGCAATGGCACGGCCGTTACCGGCATCAACGCGATCGCGATGGGCACCGGCGCCGGCGCGAATTTCCG
 ACAACTCGGTTCGCGATCGGCAGCGGCGCGACACGACGCGCGCCAACCAGGTTCGAGTCGGCACCGCCAGCAGCACCTACACGATGAG
 CGGCATCACCTCGGCTGCGAGCAAGGCGGCGCAGTCCGGACCGACCCAGCTCGTCACATCGGACGCGGCGCGCAATCTGGCGACCACC
 TCGCTGGCTGGCCTCGGACTTGCTCCGCGGCGACATCAACGGAATCAACTCCCAACTGGCCGCCCTCAACGGCCGCGTCGACAACC
 TGACACGGGAGTCGCGCGGCGGCGTGGCGTTGGCGCTCGCGGCGTCCAGCCTGCAATTGATCCTCGCCCCGGAAGATCTCGGTCTC
 CGGCGGCTTCGGCAATTTCCAGGGACAATCCGGCCTCGCGGTTCGGCTCGGCTATTCCTATTCGGACGCCATGCGCTTCAACGCGGCG
 TTCACGGCCGCACAGCAAGGCGCCATCGGCGTCAGGGCCGGCGCGTCTGGACGCTGAACTGA

SEQ ID NO: 37 (*NadA*)

MSMKHFPSKVLTTAILATFCSGALAATSDDDVKKAAATVAIVAAYNNGQEINGFKAGETIYDIGEDGTITQKDATAADVEADDFKGLGL
 KKVVTNLTKTVNENKQNVDAKVAAESEIEKLTTKLADTDAALADTDAALDETTNALNKLGENITTFAEETKTNIIVKIDKLEAVADT
 VDKHAEAFNDIADSLDETNTKADEAVKTANEAKQTAEETKQNVDAKVAAETAAGKAEAAAGTANTAADKAEAVAAKVTDIKADIATN
 KADIAKNSARIDSLDKNVANLRKETRQGLAEQAALSGLFQPYNVGRFNVTAAVGGYKSESASVAIGTGFRFTENFAAKAGVAVGTSSGS
 SAAYHVGVNVEW

SEQ ID NO: 38 (*YadA*)

MTKDFKISVSAALISALFSSPYAFADDYDGIPNLTAQVQISPNADPALGLEYPVRPPVPGAGGLNASAKGIHSIAIGATAEAAKGAAVA
 VGAGSIATGVNSVAIGPLSKALGDSAVTYGAASTAQKDGVAIGARASTSDTGAVGFGNSKADAKNSVAIGHSSHVAANHGYISIAIGDR
 SKTDRENSVSIGHESLNRQLTHLAAGTKDTHAVNVAQLKKEIEKTQENTNKRSAELLANANAYADNKSSSVLGIANNYTDSKSAETLE
 NARKEAFAQSKDVLNNAKNSVARTTLETAEEHANSVARTTLETAEEHANKKSAEALASANYVADSKSSHTLXTANSYTDVTVSNS
 TKKAIRESEQYTDKKEKQALDTRVDKGLASSALNSLQKGVGVNFTAGVGGYRSSJALAISSGYKVNENVALKAGVAYA
 GSSDVMYNASENIEW

SEQ ID NO: 39 (*Consensus*)

MXXMKXXXLLAXAIXAFSFGALAAXTDXXXTGPEAXXVXIXPAXXXLXXXXXXXXXXXXGLXAXAXXXSSXADAEAXVFK
 GLXXXXXXXXNIXTXXXXXQTKDQIAMLIRXXXNLXENKXXVXXXVAAIKXIPKDLIAKXADVXXXXVXXAXXRXTXAXNNLKSGHS
 SHVAANHGYISIAIGDRSKTDRENSVSIGHESLNRXLXXXAXKXKEEXXENIAQIDXNXEQXXEXXDKXXEXXNXXXXLAXXXXXAXX
 XAXXVNLXXXXXXXXXXXXTXXNLXQKIAEXKXNXDAXKXKAXXXXXXXXXXXXXXXXXXAXNTKDIXXLXTXXDXXXNSAXXAA
 XTXXIATEXSXXFEXXXKXXQXXQXIANNXTXVAIXEQXIXXNTARIDXLNDRVNXLDKEXKAGLASQAALSGLFQPYNVGKLVSA
 AVGGYXXXXAXAIGXGSRFENENXAAKAGVAXDTQXGGSSAGYXVGVNFEW

5 SEQ ID NO: 40 (primer)

TATCGGCAAACGACGCAAGC

SEQ ID NO: 41 (primer)

GGGCGATTAGCCATTGATAC

SEQ ID NO: 42 (primer)

AACGGTTGATGCCGCACTAG

SEQ ID NO: 43 (primer)

GTGTTGATAGGTGGCACTACTG

SEQ ID NO: 44 (primer)

GCAGAGAAAGCAAAAGGTGATTTC

SEQ ID NO: 45 (primer)

CAAAATTCCTGCAGACATCGCAAC

5 **SEQ ID NO: 46 (primer)**

CAAACGTCAGTTGCTGTAGG

SEQ ID NO: 47 (primer)

ACCTACAGCAACTGCAGTTTG

SEQ ID NO: 48 (primer)

CAACTCCCTCTTCTAAAGCTG

SEQ ID NO: 49 (primer)

AGTAGTGCCACCTATCAACAC

SEQ ID NO: 50 (Hada)

CGACGCAAGCCAAGTAATAGTAATATTTAATTAGGTATGATGTAAATTCTGCTTGAGGCAAATTTTACATAGGAAATTTTCTATATT
 GCTTTAACGTTTTTTTATAGTAGAAGTATATACTCAGTTATGGTTATGGTTACATAGTATAGTTTTACTTTGTTCTAGTTCACTTTAA
 TAACCTTAAATAATTGAGGATTTCTTATGAAAAGAAATTTATTAAACAATCTGTAAATCGCTGTGTTGATAGGTGGCACTACTGTTTC
 TAATTATGCTTTAGCACAAAGCACAAGCACAAGTCAAAAAGATGAACCTTAGTGAGTTAAAGAAACAAGTAAAGGAAATGGAT
 GCTGCTATCGATGGTATTCTTGATGATAATATTGCTTATGAAGCTGAAGTTGATGCAAACTTGATCAGCATTCTGCTGCTCTTGGTA
 GACATACAAATAGACTCAATAATCTTAAACGATTGCAGAGAAAGCAAAAGGTGATTCAAGTGAAGCACTTGATAAAATTGAAGCTCT
 TGAAGAACAAAATGATGAGTTTTTAGCGGATATTACAGCTTTAGAAGAGGGAGTTGATGGTTTAGATGATGATATCACAGGTATTCAA
 GATAATATTTCTGATATAGAAGATGATATTAATCAAAATCTGCAGACATTGCAACTAACACAGCGGCAATCGCAACTCACACTCAAC
 GTCTTGATAATTTAGATAACAGAGTAAATAACCTTAATAAAGATCTTAAACGTGGTCTTGCTGCTCAAGCTGCATTAAATGGTTTATT
 CCAACCGTATAACGTAGGTAAATTAATCTTACTGCTGCTGTAGGTGGTTATAAATCTCAAACCTGCAGTTGCTGTAGGTACTGGTTAT
 CGTTATAACGAAAATATCGCGGCTAAAGCAGGTGTTGCTTTCACTCATGGTGGCAGCGCAACTTATAATGTTGGCGTAAATTTTGAAT
 GGTAATTAGATAACTAATTTTCCATAACAGAAAATAAATACCTGTTTTTGGAGTAATATCAGAAACAGGTATTTTTTTATAGGCTTCGT
 TTCGCACACTCGTTACTAGTGTGGATATGTGAATAAAATCAATAATATTTGGAGTATTTTCATCTATTTTATTAATTTTGTAGCGGAT
 AAAATAACTTTCTGTGTGTTCCCTCCAAATCTTTAAATTCATAAACCCCTAATCGTTCATAAACGAGCTGGCATCATCATTTTTTGC
 TTCAACGACTAAAATTGTAGCAGCTACCGTAGCATTCTTAATCTTATGAATGGCGTCTGCAATTAGAACTTTCCATACCCCTTGCTTC
 TGGAAATTCGTATCAATGG

10 **SEQ ID NO: 51 (Hada)**

MKRNLLKQSVIAVLIGGTTVSNYALAQQAQAQVKKDELSELKKQVKEMDAIDGILDDNIAEYAEVDAKLDQHSALGRHTNRLNNL
 KTIAEKAKGDSSEALDKIEALFEQONDEFADITALEEGVDGLDDDDITGIQDNISDIEDDINQNSADIATNTAAIATHTQRLDNLDNRV
 NNLLKDMRSAAQAALNGLEQPYWVGKNTLWAVGGYKSOAVAVGTCYRYNENIAAKAGVAFTHGGSATYNVGVNFEH

SEQ ID NO: 52 (Hada C-terminus)

TGYRYNENIAAKAGVAFTHGGSATYNVGVNFEH

SEQ ID NO: 53 (Gene downstream of Hada)

ATGATAAATGAAAATTTAGCATATTTAAGTGTATTACCCTTAGAAGATGTAAAGATTGAGAGAAGTTCATTTTCTTGTTCAAGTTGAAC
 CTTTAGAAAACACTTTTCATAAGTACGTTTCTCAAGATGTAAAGAAAGGGCTTGCAAAGTGTTTTGTGCTTATAAATGCACAACCATC
 TAGGATTGTTGGCTATTACACTTTATCGGCATTATCAATACCAATTCCAGATATACCCCAAGAACGAATAAGTAAAGGCGTACCATAT
 CCTAATATTCCTGCTGTTTTAATAGGGCGATTAGCCATTGATACGAATTTCCAGAAGCAAGGGTATGGAAAGTTTCTAATTGCAGACG
 CCATTTCATAAGATTAGAATGCTACGGTAGCTGCTACAATTTTAGTCGTTGAAGCAAAAATGATGATGCCAGCTCGTTTTATGAACG
 ATTAGGGTTTATTGAATTTAAAGAATTTGGAGGAACACACAGAAAGTTATTTTATCCGCTAACAAAATTAATAAAATAG

SEQ ID NO: 54 (Sequence encoded by SEQ ID NO: 53)

MINENLAYLSVLPLEDVKIERSSSFSCSVEPLENYFHKYVSQDVKKGLAKCFVLINAQPSRIVGYTLSALSIPDIPQERISKGV
 PYPNIIPAVLIGRLAIDTNFQKQGYGKFLIADAIHKIKNATVAATILVVEAKNDASSFYERLGFIEFKEFGGTHRKLFPYPLTKLIK

SEQ ID NO: 55 (Histone acetyltransferase)

MINENLAYLSVLPLEDVKIERSSFSCSVEPLENYFHKYVSQDVKKGLAKCFVLINAQPSRIVGYTLSALSIPDIPQERISKGVPI
PNIPAVLIGRLAIDTNFQKQGYGKFLIADAIHKIKNATVAATILVVEAKNDDASSFYERLGFIEFKEFGGTHRKLFYPLT

SEQ ID NO: 56

GCAAGCCAAGTAACAGTAATGTTTAATTAGGTATGATTTAAATTCTGTTTTATATCACACTAGCAATGTGGGTTTCTTGATTGGTAT
TAACTAAATTACGCATTAATAAAGCGTAATTTAAGTTAATATCTTGTGGTACATTTAAGAATACAAAATGCCCATCACCTAGTG

SEQ ID NO: 57

GCAAGCCAAGTAACAGTAATGTTTAATTAGGTATGATTTAAATTCTGTTTTATATCACACTAGCAATGTGGGTTTCTTGATTGGTAT
TAACTAAATTACGCATTAATAAAGCGTAATTTAAGTTAATATCTTGTGGTACATTTAAGAATACAAAATGCCCATCACCTAGTG

SEQ ID NO: 58

GCAAGCCAAGTAACAGTAATGTTTAATTAGGTATGATTTAAATTCTGTTTTATATCACACTAGCAATGTGGGTTTCTTGATTGGTAT
TAACTAAATTACGCATTAATAAAGCGTAATTTAAGTTAATATCTTGTGGTACATTTAAGAATACAAAATGCCCATCGCCTAGTG

5 SEQ ID NO: 59

GCAAGCCAAGTAACAGTAATGTTTAATTAGGTATGATTTAAATTCTGTTTTATATCACACTAGCAATGCGGGTTTCTTGATTGGTAT
TAACTAAATTACGCATTAATAAAGCGTAATTTAAGTTAATATCTTGTGGTACATTTAAGAATACAAAATGCCCATCGCCTAGTG

SEQ ID NO: 60

GCAAGCCAAGTAACAGTAATGTTTAATTAGGTATGATTTAAATTCTGTTTTATATCACACTAGCAATGCGGGTTTCTTGATTGGTAT
TAACTAAATTACGCATTAATAAAGCGTAATTTAAGTTAATATCTTGTGGTACATTTAAGAATACAAAATGCCCATCGCCTAGTG

SEQ ID NO: 61

GCAAGCCAAGTAACAGTAATGTTTAATTAGGTATGATTTAAATTCTGTTTTATATCACACTAGAAATGAGGATTTCTTGATTGGTAT
TAACTAAATTACGCATTAATAAGGCGTAATTTAAGTTAATATCTTGTGGCACATTTAAGAATACAAAATGCCCATCGCCTAGTG

SEQ ID NO: 62

TTAGGTATGATTTAAATTCTG

SEQ ID NO: 63

ATAGTATAGTTTTACTTTGTTCTAGTTCACTTTAATAACCTTAAATAATTGAGGATTTCTTATGAAAAGAAATTTAT

10 SEQ ID NO: 64

CCGACGCAAGCCAAGTAATAGTAATATTAAATTAGGTATGATGTAAATTCTGCTTGAGGCAAATTTACATAGGAAATTTTCTATAT
TGCTTTAACGTTTTTTTATAGTAGAAGTATATACTCAGTTATGGTTATGGTTACATAGTATAGTTTTACTTTGTTCTAGTTCACTTA
ATAACCTTAAATAATTGAGGATTTCTTATGAAAAGAAATTTATTAACAATCTGTAATCGCTGTGTTGATAGGTGGCACTACTGTTT
CTAATTATGCTTTAGCACAAAGCACAAAGCAC

SEQ ID NO: 65

AGGATACGAAAAATATCGGCAAACGACGCAAGCCAAGTAACAGTAATGTTTAGGCTTGTATAGTATAGCTTTGCTTTGTTCTAGTTCA
ATTTAATAATCTTAAATAATTAAGGATTTCTTATGAAAAAAATTTATAGGCTTCGTTTCGCACACTCGTTGCTAGTATAGATATGTG
AATA